Intracerebral Hemorrhage with Cerebral Arteriovenous Malformation Rupture During Pregnancy

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The incidence of arteriovenous malformation (AVM) is approximately 1 per 100,000 population per year in unselected populations, and the point prevalence in adults is approximately 18 per 100,000 population per year. AVM accounts for between 1% and 2% of all strokes and 3% of strokes in young adults. In addition, of all primary intracerebral hemorrhages, they are responsible for 4% overall but for as high as one-third in young adults [1]. The natural history and prevalence of intracranial AVMs during pregnancy are largely unknown, because some AVMs remain asymptomatic. An AVM is a congenital tangle of abnormal arteries and veins, with interposed cavernous vascular channels that are neither arteries nor veins. The malformations can be asymptomatic and discovered incidentally, or can be accompanied by headache, seizures or focal signs. Brain AVMs usually present between the ages of 10 and 40 years. The clinical presentation typically falls into one of three categories: intracranial hemorrhage (41–79%); seizure (11–33%); and headache and focal neurologic deficit. Most of the available data suggest that the risk of hemorrhage from a brain AVM is not increased during pregnancy [2]. Pregnancy does not appear to increase the likelihood of hemorrhage from an AVM. Many women with known AVMs have been advised not to become pregnant because of concern about hemorrhaging. Hypertension and albuminuria were present at some time during the pregnancy in 34% of patients with documentation, which sometimes made it difficult to differentiate angiomatous or aneurysmal intracerebral hemorrhage from that associated with eclampsia [3].

A 32-year-old, gravida 3, para 1, abortion 1, woman had prenatal care at a clinic. She visited our emergency department when she was 36 weeks pregnant. She had sudden onset of headache associated with nausea, vomiting and dizziness. No hypertension or proteinuria was noted during her prenatal care. She also denied chronic hypertension. Unstable gait and left-side weakness were noted after the headache developed. In the emergency department, her conscious was clear and muscle power of the left-side extremities was decreased. Her blood pressure was 142/92 mmHg. Her Glasgow Coma Scale score was 14 (E4 V5 M5). The headache persisted.

Brain magnetic resonance imaging revealed intracerebral hemorrhage over the right middle cerebral artery area with mass effect (Figure). The nonstress test revealed reactivity of the fetal heart beat. Regular uterine contractions were noted with cardiotocography. The pelvic examination revealed that the cervical dilatation was 2 cm, the effacement was poor, and the station was high. A cesarean section was performed and the outcome of the newborn was well. Craniotomy for the removal of the intracerebral hemorrhage was also arranged after the cesarean section on the same day.

After the craniotomy, she was sent to the intensive care unit for further care. Complications of the maternal intracerebral hemorrhage included seizures 7 days after the craniotomy and headache. In addition, occasional nausea and vomiting were noted. The angiography was performed, and right frontal lobe AVM was diagnosed. Medical treatment with phenytoin (Dilantin) was given for the seizures. No recurrent AVM was noted after discharge.

If an intracerebral hemorrhage has already occurred, the prognosis depends on the extent of the bleeding. The major risk is compression of the normal brain tissue and the brain stem. AVMs are prone to bleeding during delivery. If the patient is approaching delivery (> 34 weeks), cesarean delivery followed by management of the anomaly is an option [4]. Whereas AVMs form only 4–5% of all intracranial hemorrhages in nonpregnant women, they account for almost 50% of intracranial hemorrhages

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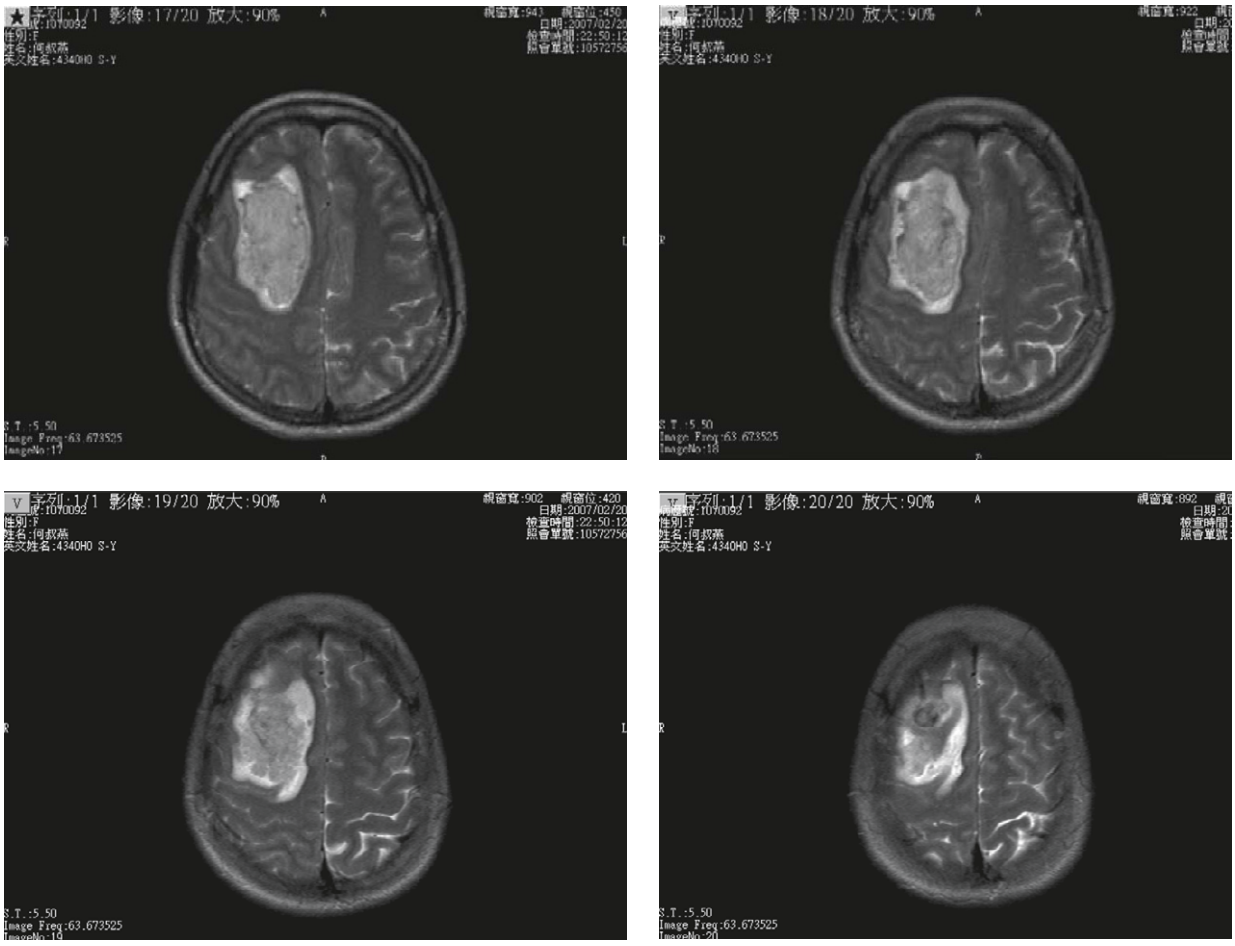

Figure. A large intracranial hemorrhage over the right centrum semiovale and corona radiata with rupture into the right lateral ventricle is noted. Effacement of the right brain sulci from brain edema and mild midline left shift is noted.

in pregnant women [5]. We believe that evaluation and treatment of the AVMs may be undertaken without regard for the pregnancy and that the pregnancy should progress without concern for the AVMs [6].

Patients who have smaller amounts of bleeding may only have headaches, nausea or vomiting as their symptoms. Those who have larger hematomas have depressed mental status, poor Glasgow Coma Scale scores, and focal neurologic deficits related to the sites of the hemorrhages. Spontaneous bleeding in the brain is often caused by a rupture of an AVM or aneurysm [7]. These malformations are often small and go clinically undetected until the rupture occurs. These diagnoses must be considered in the differential of stroke, particularly in the presence of subarachnoid hemorrhages.

The most important diagnostic guideline is that the approach to pregnant patients should be no different from that to nonpregnant patients. The history and physical examination results are extremely important during the diagnostic procedure. A computed tomography scan takes a shorter time than magnetic resonance imaging, and is less expensive. It is best for the detection of mass lesions and acute bleeding [8]. Computed tomography performed with abdominal shielding results in 2 mrad of fetal exposure and is, therefore, not contraindicated during pregnancy. Computed tomography scans have some disadvantages: (1) inability to define fully the extent of the infarction for up to 7 days, even though initial changes are seen within 4 hours; (2) difficult evaluation of brain stem anatomy because of bony artifacts.

If an AVM or aneurysm is diagnosed before the hemorrhage, surgical intervention can take place to correct the malformation. This intervention includes embolization or surgical clipping [3]. If an intracerebral hemorrhage has already occurred, the prognosis depends on the extent of the bleeding. The major risk is compression of the normal brain tissue and the brain stem. If the bleeding and patient are stable, surgical intervention is not warranted.

Since surgical intervention has a high operative risk, conservative management should be performed during pregnancy. Considering the condition of this patient with a large intracranial hematoma, craniotomy was done for decompression. In view of the high survival

rate of this fetus at 36 weeks of pregnancy, the decision to terminate the pregnancy was made. The method of delivery was cesarean, because AVMs are prone to bleeding during vaginal delivery.

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